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**Zhang et al.**

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(54) METHOD AND APPARATUS FOR PROGRAMMABLE FIELD EMISSION DISPLAY

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345/77, 78, 80, 81

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(57) **ABSTRACT**

A method and apparatus for programmable field emission display comprising an array of cathodoluminescent elements. Each cathodoluminescent element in the array is responsive to separate select signals to cause light to be emitted from said display at a location in the array corresponding to each separate cathodoluminescent element. In one embodiment, to account for processing variation and the like, each cathodoluminescent element is provided with a programmable element for adjusting the operating level of the associated cathodoluminescent element in response to select signals of predetermined voltage levels. Each programmable element includes a charge storage device and is initially programmed by storing a level of electric charge thereon such that uniformity of operation among the plurality of cathodoluminescent elements in the array is improved. In one embodiment the programmable element comprises a floating gate transistor. In another embodiment, each cathodoluminescent element is provided with an infrared-sensitive element for modulating the operating level of the corresponding cathodoluminescent element in relation to the intensity of infrared radiation to which the infrared-sensitive element is exposed, thereby enabling the field emission display to operate as an infrared radiation sensing and display device.

**55 Claims, 7 Drawing Sheets**

